

ORDER FOR SUPPLIES OR SERVICES

PAGE OF PAGES

IMPORTANT: Mark all packages and papers with contract and/or order numbers.

1. DATE OF ORDER	2. CONTRACT NO. (if any)	6. SHIP TO:	
3. ORDER NO.	4. REQUISITION/REFERENCE NO.	a. NAME OF CONSIGNEE Transportation Officer, NASA	
5. ISSUING OFFICE (Address correspondence to)		b. STREET ADDRESS JBOSC WAREHOUSE, BLDG. M6-744	
7. TO:		c. CITY Kennedy Space Center	d. STATE FL
a. NAME OF CONTRACTOR		e. ZIP CODE 32899	
b. COMPANY NAME		f. SHIP VIA	
c. STREET ADDRESS		8. TYPE OF ORDER	
d. CITY	e. STATE	f. ZIP CODE	<input type="checkbox"/> a. PURCHASE <input checked="" type="checkbox"/> b. DELIVERY – Except for billing instructions on the reverse, this delivery order is subject to instructions contained on this side only of this form and is issued subject to the terms and conditions of the above-numbered contract.
9. ACCOUNTING AND APPROPRIATION DATA		10. REQUISITIONING OFFICE John F. Kennedy Space Center/NASA Procurement Office, OP-ES/Tyrone Frey 321-867-9162 Kennedy Space Center, FL 32899	

11. BUSINESS CLASSIFICATION (Check appropriate box(es))				12. F.O.B. POINT	
<input type="checkbox"/> a. SMALL	<input type="checkbox"/> b. OTHER THAN SMALL	<input type="checkbox"/> c. DISADVANTAGED	<input type="checkbox"/> g. SERVICE-DISABLED VETERAN-OWNED	See Block 6	
<input type="checkbox"/> d. WOMEN-OWNED	<input type="checkbox"/> e. HUBZone	<input type="checkbox"/> f. EMERGING SMALL BUSINESS			
13. PLACE OF		14. GOVERNMENT B/L NO.	15. DELIVER TO F.O.B. POINT ON OR BEFORE (Date)	16. DISCOUNT TERMS	
a. INSPECTION Kennedy Space Ctr	b. ACCEPTANCE Kennedy Space Ctr		June 19, 2008		

17. SCHEDULE (See reverse for Rejections)

ITEM NO. (a)	SUPPLIES OR SERVICES (b)	QUANTITY ORDERED (c)	UNIT (d)	UNIT PRICE (e)	AMOUNT (f)	QUANTITY ACCEPTED (g)
	THIS IS A CATAGORY A (FLUIDS GSE) ORDER					
1	PANEL ASSEMBLY, GN2 HAZARDOUS AND CAMERA PURGE in accordance with KSC DRAWING 10C00002 dated 10/8/07, sheets 1 through 10.	1	ea			
2	Progress Charts *(Not Separately Priced)	3	cpy	*	*	
3	Applicable Welding Documentation *(Not Separately Priced)	3	cpy	*	*	
4	Shop Drawings *(Not Separately Priced)	3	set	*	*	
5	Test Procedures *(Not Separately Priced)	3	cpy	*	*	
6	As-Built Drawings *(Not Separately Priced)	1	set	*	*	
7	Acceptance Data Package *(Not Separately Priced)	3	cpy	*	*	

SEE BILLING INSTRUCTIONS ON REVERSE	18. SHIPPING POINT	19. GROSS SHIPPING WEIGHT	20. INVOICE NO.		17(h) TOT. (Cont. pages)	
	21. MAIL INVOICE TO:					
	a. NAME NASA/Kennedy Space Center Accounts Payable					17(i) GRAND TOTAL
	b. STREET ADDRESS (or P.O. Box) Mail Code GG-B-C2					
c. CITY Kennedy Space Center	d. STATE FL	e. ZIP CODE 32899				

22. UNITED STATES OF AMERICA BY (Signature) ▶

23. NAME (Typed)
Tyrone J Frey
TITLE: CONTRACTING/ORDERING OFFICER

This Delivery Order is subject to the terms and conditions and contract clauses of the Basic Contract NNK08 TBD . Below are terms and conditions and fill-ins that are specific to this acquisition.

SECTION B – SUPPLIES OR SERVICES AND PRICES/COSTS

B. 1 INDEFINITE DELIVERY/INDEFINITE QUANTITY DELIVERY ORDERS

Category A Fluids

B. 4 NFS 1852.216-78 FIRM FIXED PRICE (DEC 88)

The total firm fixed price of this contract is TBD

SECTION C – DESCRIPTION/SPECIFICATION/WORK STATEMENT

C. 1 SCOPE OF WORK

Fabricate 1 GN2 Hazardous and Camera Purge Panel Assembly in accordance with listed drawings and Statement of Work titled “GN2 Hazardous and Camera Purge Panel, dated 7/10/08. Panel provides inert gaseous nitrogen purge gas to various sealed electrical equipment boxes including weather-tight video camera enclosures.

C. 3 CONTRACT DRAWINGS, MAPS AND SPECIFICATIONS

The work shall conform to the following contract drawings and specifications attached hereto and made a part hereof:

10C0002, Panel Assembly, GN2 Hazardous and Camera Purge, 14 Pages

The following specifications are applicable to this Delivery Order:

Item	Reference(s)	Specification	Specification Title
1	Spec	A-A-208	Ink, Marking, Stencil, Opaque, (Porous And Non-Porous Surface
2.	Spec	ASTM-C-920	Standard Specification for Elastomeric Joint Sealants
3.	Spec	ASTM D4285	Standard Method for Indicating Oil or Water Compressed Air
4.	Spec	FED-STD-595	Colors Used In Government Procurement
5.	Spec	GP-425	KSC Fluid Fitting Engineering Standards
6.	Spec	KSC-C-123	Surface Cleanliness Of Fluid Systems, Specification For
7.	Spec	KSC-F-124	Fittings, Flared Tube, Specification for
8	Spec	KSC-SPEC-Z-0008	Flared Tube Assemblies And Installation Of Fittings And Fitting Assemblies, Fabrication And Installation Of, Specification For
9.	Spec	KSC-SPEC-Z-0009	Lubrication, Thread, Corrosion-Resistant Steel and Aluminum Alloy Tube Fittings, Specification For
10.	Spec	KSC-STD-E-0015	Marking of Ground Support Equipment, Standard for
11.	Spec	MIL-PRF-27401	Propellant, Pressurizing Agent, Nitrogen
12.	Spec	MSFC-STD-486	Standard, Threaded Fasteners, Torque Limits For
13.	Spec	NASA-SPEC-5004	Welding Of Aerospace Ground Support Equipment And Related Non Conventional Facilities
14.	Spec	NASA-STD-5008REV A	Protective Coating Of Carbon Steel, Stainless Steel, And Aluminum On Launch Structures, Facilities, And Ground Support Equipment
15.	Spec	SAE ARP 901	Bubble Point Test Method
16.	Spec	ANSI/NCSL Z540.1 1994	Calibration Laboratories and Measuring and Test Equipment General Requirements
17.	Spec	ANSI/AWS D1.1	Structural Welding Code – Steel
18.	Spec	NACE No. 2	Joint Surface Preparation Standard Near-White Metal Blast Cleaning

SECTION E - INSPECTION AND ACCEPTANCE

- E.2 FAR 52.246-15 CERTIFICATE OF CONFORMANCE (APRIL 1984)**
- E.3 NFS 1852.246-72 MATERIAL INSPECTION AND RECEIVING REPORT. (AUG 2003)**
- E.4 NFS 1852.246-71 GOVERNMENT CONTRACT QUALITY ASSURANCE FUNCTIONS. (OCT 1988)**

In accordance with the inspection clause of this contract, the Government intends to perform the following functions at the locations indicated:

Item	Quality Assurance Location	Function
GN2 Panel	Contractor's Plant	Inspect and verify tube flares meet requirements of ASTM AS4330.
		Inspect and verify the assembly meets the requirements in KSC-SPEC-Z-0008 section 5.3 Examination of Fittings, Tubes, and Fitting

		Assemblies.
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(End of Clause)

NFS 1852.246-73 HUMAN SPACE FLIGHT ITEM (MARCH 1997)

E.12.6 ACCEPTANCE TESTING

Limited acceptance testing and inspection is required for the GN2 Hazardous and Camera Purge Panel at the vendor site prior to shipment to KSC. Factory acceptance testing is denoted in the Statement of Work document SOW-10C00002. Material Sample Tensile Tests or Material Certifications are required from the contractor to ensure material integrity. Contractor dimensional checks and contractor developed, NASA approved, acceptance testing procedures to ensure basic operation of the GN2 Hazardous and Camera Purge Panel at the vendor site is also required. Acceptance of the hardware by NASA will be at KSC where the DD250 is completed. After acceptance by the government, NASA will conduct further testing of the GN2 Hazardous and Camera Purge Panel at KSC. Contractor participation in NASA Acceptance Testing at KSC is not required. Contractor is required to give the Contracting Officer or the Contracting Officer's Technical Representative a minimum 72 hours notice prior to testing so that a Government Quality Representative is present for the testing. The submitted testing procedures shall include a schedule of testing.

SECTION F – DELIVERIES OR PERFORMANCE

FAR 52.247-55 F.O.B. POINT FOR DELIVERY OF GOVERNMENT-FURNISHED PROPERTY (JUN 2003)

SECTION G – CONTRACT ADMINISTRATION DATA

NFS 1852.245-76 LIST OF GOVERNMENT-FURNISHED PROPERTY PURSUANT TO FAR 52.245-1(DEVIATION)(SEPTEMBER 2007)

(a) For performance of work under this contract, the Government will make available Government property identified below of this contract on a no-charge-for-use basis pursuant to the clause at FAR 52.245-1, Government Property. The Contractor shall use this property in the performance of this contract at the contractor's plant and at other location(s) as may be approved by the Contracting Officer. Under FAR 52.245-1, the Contractor is accountable for the identified property.

Item	Quantity	Acquisition Cost	Date to be Furnished to the Contractor
ADAPTER AND BOSS, REDUCER AS4317K1612	2	83.20	10 calendar days after effective date of order
ADAPTER AND BOSS, REDUCER AS4317K2416	2	174.00	10 calendar days after effective date of order
ADAPTER, BOSS TO TUBE, 1/4" AS4307K4	5	38.70	10 calendar days after effective date of order
ADAPTER, BOSS TO TUBE, 1" AS4307K16	2	46.90	10 calendar days after effective date of order
ADAPTER, BOSS TO TUBE, 2" AS4307K32	2	245.70	10 calendar days after effective date of order

ADAPTER, BULKHEAD AND BOSS, 1/4" AS4318K4	3	24.84	10 calendar days after effective date of order
ADAPTER, BULKHEAD AND BOSS, 1-1/2" AS4318K24	4	374.20	10 calendar days after effective date of order
CAP ASSEMBLY, 1/4" AS4329K4	2	7.58	10 calendar days after effective date of order
CAP ASSEMBLY, 3/8" AS4329K6	1	3.61	10 calendar days after effective date of order
CAP ASSEMBLY, 1" AS4329K16	2	49.30	10 calendar days after effective date of order
CAP ASSEMBLY, 1-1/2" AS4329K24	1	82.70	10 calendar days after effective date of order
CAP ASSEMBLY, 1/4" AS4329K4A	3	32.73	10 calendar days after effective date of order
ELBOW, MALE ADJUSTABLE, 1/4" AS4303K04	9	99.00	10 calendar days after effective date of order
ELBOW, MALE ADJUSTABLE, -1/2" AS4303K24	1	152.00	10 calendar days after effective date of order
ELBOW, FEMALE, SWIVEL, 1/4" AS4315K04	3	35.70	10 calendar days after effective date of order
ELBOW, FEMALE SWIVEL, 3/4" AS4315K12	2	66.70	10 calendar days after effective date of order
ELBOW, FEMALE SWIVEL, 1" AS4315K16	2	87.46	10 calendar days after effective date of order
ELBOW, FEMALE SWIVEL, 1-1/2" AS4315K24	3	684.00	10 calendar days after effective date of order
ELBOW, FEMALE SWIVEL, 2" AS4315K32	2	512.00	10 calendar days after effective date of order
EXPANDER, ADAPTER, BOSS TO TUBE, 1" TO 3/4" AS4319K1216	4	232.00	10 calendar days after effective date of order
NUT, COUPLING, 2" KC142L32	4	1220.00	10 calendar days after effective date of order
NUT, COUPLING, 1/4" KC142L4	58	1769.40	10 calendar days after effective date of order
NUT, COUPLING, 3/8" KC142L6	4	129.88	10 calendar days after effective date of order
NUT, COUPLING, 1/2" KC142L8	2	87.16	10 calendar days after effective date of order
NUT, COUPLING, 3/4" KC142L12	8	509.60	10 calendar days after effective date of order
NUT, COUPLING, 1" KC142L16	14	1037.40	10 calendar days after effective date of order
NUT, COUPLING, 1-1/2" KC142L24	12	1968.00	10 calendar days after effective date of order
NUT, VENT, 2" AA1576-32K20	4		10 calendar days after effective date of order
NUT, VENT, 1/4" AA1576-4K20	3		10 calendar days after effective date of order
ORIFICE, UNION BULKHEAD	1	82.70	10 calendar days after effective date of order

KC176K4-030			order
REDUCER-ADAPTER, 1" TO 1/2" AS4301K1608	2	21.66	10 calendar days after effective date of order
REDUCER-ADAPTER, 1-1/2" TO 3/4" AS4301K2412	2	136.00	10 calendar days after effective date of order
REDUCER-ADAPTER, 1/2" TO 1/4" AS4301K0804	2	12.00	10 calendar days after effective date of order
REDUCER-ADAPTER, 3/4" TO 1/4" AS4301K1204	4	36.56	10 calendar days after effective date of order
UNION, REDUCER, 3/8" TO 1/4" AS1368K0604	1	10.67	10 calendar days after effective date of order
RING SEAL, PTFE, 1/4" AS1097-04	74	35.52	10 calendar days after effective date of order
RING SEAL, PTFE, 3/8" AS1097-06	5	1.10	10 calendar days after effective date of order
RING SEAL, PTFE, 1/2" AS1097-08	2	1.24	10 calendar days after effective date of order
RING SEAL, PTFE, 3/4" AS1097-12	12	7.92	10 calendar days after effective date of order
RING SEAL, PTFE, 1" AS1097-16	20	14.80	10 calendar days after effective date of order
RING SEAL, PTFE, 1-1/2" AS1097-24	20	21.20	10 calendar days after effective date of order
RING SEAL, PTFE, 2" AS1097-32	10	21.20	10 calendar days after effective date of order
SLEEVE, FLARED TUBE, 2" KC143L32	4	456.00	10 calendar days after effective date of order
SLEEVE, FLARED TUBE, 1/4" KC143L4	58	43.80	10 calendar days after effective date of order
SLEEVE, FLARED TUBE, 3/8" KC143L6	4	3.88	10 calendar days after effective date of order
SLEEVE, FLARED TUBE, 3/4" KC143L12	4	11.16	10 calendar days after effective date of order
SLEEVE, FLARED TUBE, 1" KC143L16	12	55.20	10 calendar days after effective date of order
SLEEVE, FLARED TUBE, 1-1/2" KC143L24	10	37.60	10 calendar days after effective date of order
TEE, MALE ADJUSTABLE, 1/4" AS4306K04	2	43.06	10 calendar days after effective date of order
TEE, MALE ADJUSTABLE, 1/4" AS4305K04	15	255.00	10 calendar days after effective date of order
TEE, MALE ADJUSTABLE, 1" AS4305K16	2	160.00	10 calendar days after effective date of order
TEE, MALE ADJUSTABLE, 1-1/2" AS4305K24	1	276.00	10 calendar days after effective date of order
TEE, FEMALE SWIVEL, 1/4" AS4302K04	1	19.43	10 calendar days after effective date of order
TEE, FEMALE SWIVEL, 3/4" AS4302K12	2	80.76	10 calendar days after effective date of order

TEE, FEMALE SWIVEL, 1" AS4302K16	2	122.56	10 calendar days after effective date of order
TEE, FEMALE SWIVEL, 1/4" AS4304K04	1	19.43	10 calendar days after effective date of order
TEE, FEMALE SWIVEL, 1-1/2" AS4302K24	2	360.00	10 calendar days after effective date of order
TEE, FEMALE SWIVEL, 1/4" AS4304K04	1	19.43	10 calendar days after effective date of order
TEE, FEMALE SWIVEL, 1-1/2" AS4304K24	2	257.90	10 calendar days after effective date of order
UNION, BULKHEAD, 1/4" AS1100K04	4	43.88	10 calendar days after effective date of order
UNION, BULKHEAD, 3/8" AS1100K06	2	28.16	10 calendar days after effective date of order
UNION, BULKHEAD, 1" AS1100K16	3	164.85	10 calendar days after effective date of order
TEE, BULKHEAD, 2" AS1365K32	2	836.00	10 calendar days after effective date of order
TUBING, WELDED 1/4" X 0.035 WALL UNS NO08367 ASTM A249, MAT'1 TYPE	60 ft	294.00	10 calendar days after effective date of order
TUBING, WELDED 3/8" X 0.035 WALL UNS NO08367 ASTM A249, MAT'1 TYPE	20 ft	129.00	10 calendar days after effective date of order
TUBING, WELDED 1-1/2" X 0.049 WALL UNS NO08367 ASTM A249, MAT'1 TYPE	20 ft	241.00	10 calendar days after effective date of order
TUBING, WELDED 3/4" X 0.065 WALL UNS NO08367 ASTM A249, MAT'1 TYPE	20 ft	164.00	10 calendar days after effective date of order
TUBING, WELDED 1" X 0.095 WALL UNS NO08367 ASTM A249, MAT'1 TYPE	20 ft	424.00	10 calendar days after effective date of order
TUBING, WELDED 2" X 0.065 WALL TUBING, WELDED 3/4" X 0.065 WALL UNS NO08367 ASTM A249, MAT'1 TYPE	20 ft	456.00	10 calendar days after effective date of order

(End of clause)

SECTION I – CONTRACT CLAUSES

**FAR 52.249-2 TERMINATION FOR CONVENIENCE OF THE GOVERNMENT
 (FIXED PRICE) (May 2004)**

FAR 52.245-1 GOVERNMENT PROPERTY (JUNE 2007)

ATTACHMENT J-A – INCIDENTAL DELIVERABLES FOR DELIVERY ORDERS

THE DELIVERABLES IDENTIFIED IN BASIC CONTRACT ARE APPLICABLE TO ALL TASK ORDERS ISSUED UNDER THE BASIC CONTRACT UNLESS SPECIFIED OTHERWISE.

J-A-1 ACCEPTANCE DATA PACKAGE

As required, the contractor shall provide the following data in the ADP:

Item	Description	Required/Not Required
1.	Requests for Information (RFI's)	R
2.	Approved Deviations and Waivers	R
3.	Welding Procedures	R
4.	Welding Inspection Records	R
5.	NACE Inspection Records	R
6.	Approved Acceptance Test Procedures	R
7.	Final Acceptance Test Records	R
8.	Manufacturer's Catalog Data	R
9.	Spare Parts Data	NR
10.	Operation and Maintenance Manuals	NR
11.	Shop Drawings	R
12.	As-Built Drawings	R
13.	Calibration Data and Records	R
14.	Cleaning Certification Data	R
15.	Commercial Warranties	R
16.	Certificates of Conformance	R

DELIVERY SCHEDULE:

Delivery shall be in accordance with the following:

<u>Item</u>	<u>Description</u>	<u>Qty.</u>	<u>Deliver on or Before</u>
1	GN2 Hazardous and Camera Purge Panel Assembly	1 ea	100 Days from the Effective date of order
2	Progress Charts	3 cpy	30 days from effective date of order and every 30 days thereafter until all items have been delivered.
3	Welding Documentation	3 cpy	30 days from the effective date of the order
4.	Shop Drawings	3 sets	30 days from the effective date of the order
5	Test Procedures	3 cpy	30 days prior to testing
6	As-Built Drawings	1 set	100 Days from the Effective date of order

7. Acceptance Data Package 3 cpy 100 Days from the Effective date of order

DELIVERY ADDRESS:

(a) The Contractor shall ship the items required under this contract to:

TRANSPORTATION OFFICER
NASA, KENNEDY SPACE CENTER
J-BOSC WAREHOUSE, BUILDING M6-744
KENNEDY SPACE CENTER, FLORIDA 32899

MARKED FOR:

CONSIGNEE: Thomas Lippitt 321.867.1391

CONTRACT NUMBER: NNK08

ORGANIZATION/OFFICE CODE: NE-F2

BUILDING NO.: M6-0399:3270A

(b) Unless otherwise authorized in advance by the Contracting Officer, deliveries under this contract shall be made between the hours of 7:20 a.m. and 3:30 p.m., Monday through Friday, excluding Federal holidays.

(c) Additional delivery instructions:

None

(d) Additional marking instructions:

A packing list or other suitable shipping document shall accompany each shipment. The packing list may be enclosed in the package or securely attached to the outside of the package in a sturdy waterproof envelope. Where more than one package is involved in a shipment, the package containing the package list shall be identified with the words "Contains Packing List."

Packing lists shall include, but not be limited to, the following:

Name and address of consignor, name and address of consignee, applicable NASA Purchase or Delivery Order number, description of the material shipped, including item number, quantity, number of containers, and package number, if any.

**ATTACHMENT J-B – PROVISIONS INCLUDED IN DELIVERY ORDER
SOLICITATIONS**

**LISTING OF FEDERAL ACQUISITION REGULATION (48 CFR CHAPTER 1)
PROVISIONS INCORPORATED BY REFERENCE**

FAR 52.203-11	CERTIFICATION AND DISCLOSURE REGARDING PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS (SEP 2007)
FAR 52.211-6	BRAND NAME OR EQUAL (AUG 1999)
FAR 52.211-1	AVAILABILITY OF SPECIFICATIONS LISTED IN THE GSA INDEX OF FEDERAL SPECIFICATIONS, STANDARDS AND COMMERCIAL ITEM DESCRIPTIONS, FPMR PART 101-29 (AUG 1998)

FAR 52.211-3

**AVAILABILITY OF SPECIFICATIONS NOT LISTED IN THE
GSA INDEX OF FEDERAL SPECIFICATIONS, STANDARDS
AND COMMERCIAL ITEM DESCRIPTIONS. (JUN 1988)**

FAR 52.225-2

BUY AMERICAN CERTIFICATE (JUN 2003)

Statement of Work

GN2 HAZARDOUS AND CAMERA PURGE PANEL

Drawing No. 10C00002

November 17, 2007

NASA FLUIDS DESIGN ENGINEERING

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1.0 SCOPE

This statement of work (SOW) contains additional requirements and clarifications for the fabrication, testing and delivery of the GN2 Hazardous and Camera Purge panel to Kennedy Space Center, FL. This SOW does not replace the requirements noted on the drawing.

2.0 APPLICABLE DOCUMENTS

The latest revision of the documents listed below form a part of this specification to the extent specified herein. In the event of conflict between the referenced documents and the contents of this specification, the contents of this specification shall govern.

2.1 GOVERNMENTAL

Department of Defense

MIL-PRF-27401 Propellant, Pressurizing Agent, Nitrogen

Kennedy Space Center Drawings and Instructions

10C00002 GN2 Hazardous and Camera Purge

Kennedy Space Center Specifications and Standards

KSC-C-123	Surface Cleanliness of Fluid Systems, Specification for
KSC-F-124	Fittings, Flared Tube, Specification For
KSC-SPEC-Z-0008	Fabrication and Installation of Flared Tube Assemblies and Installation of Fittings and Fitting Assemblies
KSC-SPEC-Z-0009	Lubrication, Thread, Corrosion-Resistant Steel and Aluminum Alloy Tube Fittings, Specification for
GP-425	KSC Fluid Fitting Engineering Standards
KSC-STD-E-0015	Marking of Ground Support Equipment, Standard For
NASA-STD-5008	Protective Coating of Carbon Steel, Stainless Steel, and Aluminum on Launch Structures, Facilities, and Ground Support Equipment
KNPR 8715.3	KSC Safety Practices

2.2 NON-GOVERNMENTAL

American National Standards Institute (ANSI)

ANSI/NCSL Z540.1-1994

Calibration Laboratories and Measuring and
Test Equipment—General Requirements**American Society for Testing and Materials (ASTM)**

ASTM D4285

Standard Test Method for Indicating Oil or
Water in Compressed Air**American Welding Society**

AWS D1.1

Structural Welding Code – Steel

Society of Automotive Engineers

SAE ARP 901

Bubble Point Test Method

3.0 GOVERNMENT FURNISHED EQUIPMENT (GFE)

In order to expedite project completion, certain items shall be supplied as GFE to the Contractor. GFE list will be provided under a separate document.

4.0 FABRICATION**4.1 PNEUMATIC / STRUCTURAL****4.1.1 GN2 Hazardous and Camera Purge Panel**

Fabrication of the GN2 Hazardous and Camera Purge panel shall be in accordance with drawing 10C00002 to include a structural frame as free-standing type, Photo-etch faceplate decal, associated components and panel tubing.

4.2 WELDING

All structural welding shall be accomplished in accordance with AWS D1.1, certified welders with the appropriate certification for the material being worked shall be used. Welder's certifications and weld procedures shall be submitted prior to start of work.

4.3 PNEUMATIC REQUIREMENTS**4.3.1 Tubing Material and Ratings**

Flared pneumatic tubing runs shall be of seamed, AL6XN stainless steel tubing fabricated and installed per KSC-SPEC-Z-0008.

Tube material shall be per ASTM A249, material type UNS N08367 (AL6XN), full furnace bright annealed and passivated.

NOTE: KSC-SPEC-Z-0008 does not address the use of AL6XN tube material. All requirements in KSC-SPEC-Z-0008 shall apply to AL6XN tubing except the following:

- The test ball size used for checking the tube inside diameter after bending shall be 0.344" for 1/2"x0.049"wall tube and 0.250" for 3/8"x0.035" wall tube.

4.3.2 Threaded Fittings

Threaded fittings using standard 37-degree flare end shall be per the appropriate KC or AS standard listed in KSC-GP-425 and procured per KSC-F-124.

Note that the following re-ratings apply for KC tubing fittings:

Fitting Dash Number	Fitting Size (inch)	Allowable Pressure (psi)
4	1/4	9,900
6	3/8	6,900
8	1/2	7,400
12	3/4	7,000
16	1	6,500
20	1 ¼	6,300
24	1 ½	5,600
32	2	5,500

4.3.3 Tubing Assembly Requirements

4.3.3.1 Tubing System Workmanship

Each tubing subassembly shall be fabricated to the dimensional accuracy that, when assembled, no springing or distortion of the tubing is required to achieve a proper fit. With the exception to locations where a slope is required, all final assemblies shall be neat in appearance, all lines plumb, and all square or parallel to panel edge lines.

4.3.3.2 Tube Assembly Fabrication

Each flared tube assembly shall be fabricated following the requirements identified in KSC-SPEC-Z-0008.

4.3.3.3 Inspection of Tube Assemblies and Fittings

The Contractor shall perform inspections of flared tube assemblies and fittings in accordance with sections 5.3.1 through 5.3.4 of KSC-SPEC-Z-0008.

Flared tube ends shall be inspected per the requirements and dimensions per AS4330.

4.3.3.4 Hydrostatic Test

All fabricated tube assemblies shall be hydrostatically tested using filtered water to the pressure indicated in Table 7 of KSC-SPEC-Z-0008.

4.3.3.5 Hydrostat Documentation

The Contractor shall submit proper documentation of all hydrostatic testing. Test reports shall consist of the following:

- a. Date of Test
- b. Identification for tubing assembly tested (cross reference with drawing)
- c. Test Fluid

- d. Test pressure recorded at indicated time intervals with test fluid temperature.
- e. Certification of calibration for all gauges used.
- f. Certification of visual inspection and test results by the examiner (Quality personnel / QC stamps)

4.3.4 Component Calibration

The Contractor is responsible for obtaining certified calibration traceable to NIST standards on the pressure gauges, relief valves and filters.

The 10-micron filter elements used for leak testing and function testing shall be verified by performing a bubble point test SAE ARP901, Bubble Point Test Method.

Competence of calibration laboratory shall meet the requirements of ANSI/NCSL Z540.1-1994 (including, but not limited to, Measurement Traceability, Uncertainty, Personnel Training and Record Keeping.)

4.3.5 Cleaning

The Contractor is responsible for the precision cleaning of all tubing and piping systems, including all components, fittings, gaskets, seals, etc., used in this subcontract.

Components shall be disassembled, cleaned and reassembled in accordance with KSC-C-123 and in an environment conforming to ISO 14644 Class 8. The Contractor is also responsible for maintaining and preserving the cleanliness of all precision cleaned components and tubing in accordance with the cleanliness level indicated on the drawing.

Approved cleaning facilities that meet the requirements of KSC-C-123 shall be used for all components and tubing assemblies. A list of facilities that have been verified to meet the requirements of KSC-C-123 can be found in Appendix B. If a contractor chooses to submit a cleaning facility not listed in Appendix B, the proposed cleaning facility will be certified by the Government at no cost to the contractor prior to fabrication. If the proposed cleaning facility does not meet the requirements of KSC-C-123, the contractor shall not begin fabrication until they submit an approved cleaning facility.

All assembly and testing operations, unless otherwise specified, shall be performed in an environment conforming to ISO 14644 Class 8 to maintain the cleanliness level of the equipment indicated on the drawing. The results from testing each clean room or clean zone and a statement of compliance with the specified cleanliness classification per the requirements in ISO 14644-1 shall be submitted prior to start of work.

4.3.6 Installation of Tube Assemblies, Fittings, Fitting Assemblies and Components

Assemblies, fittings and components shall be free from damage prior to installation. Maintain strict system cleanliness during assembly.

Tube joints and fittings shall be assembled using only Krytox 240 AC or other approved compatible lubricant per KSC-SPEC-Z-008. Coupling nut connections shall be tightened to the torque values specified in section 4.7.2 and Table 11 of KSC-SPEC-Z-0008, latest revision.

4.3.7 Leak Testing

All assembled pneumatic systems shall be leak tested at the maximum operating pressure with nitrogen conforming to MIL-PRF-27401, Type 1, Grade A. The leak test system shall be cleaned to the same level or better than the panel cleanliness level. A 10-micron filter shall be placed at the inlet of the panel to maintain the cleanliness level of the panel assembly. As a minimum, all test points (mechanical connections, gasketed joints, seals, etc.) shall be bubble tight for a minimum of one minute when leak test solution is applied. Leak detection compound conforming to MIL-PRF-25567 shall be used.

5.0 PROTECTIVE COATING SYSTEM

5.1 GENERAL

Panel and frame fabrications shall have the appropriate coating system applied as indicated on the fabrication drawing. Sub-assemblies shall be painted separately. All exposed metal other than stainless steel shall be coated. Quality control shall be performed by an independent NACE certified coating inspector Level 3 provided by the Contractor.

Preventive measures are required to protect coated surfaces during handling and transport.

Painting shall be done after all fabrication and machining processes.

5.2 APPROVED COATINGS

The coatings applied shall be as specified in NASA-STD-5008. The manufacturer's instructions for storage, handling, and application of coating materials shall be strictly followed.

5.3 COMPRESSED AIR CLEANLINESS

Prior to using compressed air for abrasive blast cleaning, blowing down the surfaces, and painting with conventional spray, the Contractor shall verify that the compressed air is free of moisture and oil contamination according to the requirements of ASTM D 4285. The tests shall be conducted at least one time each shift for each compressor system in operation and recorded on the coating system daily inspection report. If air contamination is evident, the Contractor shall change filters, clean traps, add moisture separators or filters, or make other adjustments as necessary to achieve clean, dry air. The Contractor shall also examine the work performed since the last acceptable test for evidence of defects or contamination caused by the compressed air. Effected work shall be repaired at the Contractor's expense.

5.4 COLOR REQUIREMENTS

The finish coat shall conform in gloss, hue, and chroma to FED STD 595 color as Gray #16251.

6.0 FACTORY ACCEPTANCE TESTING

The Contractor shall submit a factory acceptance test procedure for approval. The factory acceptance test shall include but is not limited to: verification of regulator

function, pressure switch set points, solenoid valve operation, manual valve operation and leak check.

Nitrogen conforming to MIL-PRF-27401, Type 1, Grade A shall be used to perform the factory acceptance tests. The test system shall be cleaned to the same level or better than the panel cleanliness level. A 10-micron filter shall be placed at the inlet of the panel to maintain the cleanliness level of the panel assembly. Results shall be documented and submitted with the final data package.

7.0 QUALITY ASSURANCE

All equipment delivered under this specification shall conform to the highest commercial standards for fit, finish, and workmanship.

7.1 QA INSPECTION AREAS

Quality Assurance inspection shall be included, but not limited to the following tasks:

- a. hydrostatic testing of pneumatic tubing;
- b. chemical cleaning of pneumatic system;
- c. leak check of assembled hardware.
- d. functional testing;
- e. structural welds.
- f. coatings.

Reference the attached Quality Inspection Points table in Appendix A and note the notification requirement.

7.2 NOTIFICATIONS

The Contract Administrator shall be notified for Quality Inspection / witness for each of the above milestones a minimum of 5 working days prior to initiating the task.

7.3 CONTAMINATION CONTROL

The Contractor's cleaning procedures shall include Quality Assurance provisions for in-process controls to prevent contamination, including provisions for maintaining cleanliness of on-site, pre-packaged components, and sub-assemblies. The Contractor shall double package all precision cleaned components per KSC-C-123.

7.4 COMPONENT TRACEABILITY

Cleanliness certifications, hydrostatic and leak test results, and material certifications must be traceable to each item or component with a unique identifier (commonly referred to as A-Numbers or Find Numbers) and/or serial number. All required test results and certifications shall be packaged with each unique component.

Copies of test results, certifications, and component data sheets shall be included in the final data package in accordance with KNPR 8715.3 for Pressure Vessels and Pressurized Systems.

8.0 SUBMITTAL DOCUMENTS

The submittal documents to be forwarded to the Subcontract Administrator are summarized for clarity. Included also are the intended milestones at which phase in the subcontract the submittals are due. These timelines are represented by the following codes:

- (P)** - Prior to start of work
- (F)** – Fabrication (during or after the interval it occurs), and
- (C)** – Project closeout

8.1 PROCEDURES

- Welding Procedure **(P)**
- Chemical Cleaning Procedure **(P)**
- Hydrostatic Testing Procedure **(P)**
- Leak Testing Procedure **(P)**
- Factory Acceptance Testing **(P)**

8.2 CERTIFICATIONS

- Welders Certification **(P)**
- Tube Flaring Certification **(P)**
- NACE Inspector Certification **(P)**

8.3 INSPECTIONS

- Tube Flare Samples **(P)**
- Tubing Inspection Results **(F)**

8.4 TESTING

- Protective Coating Reports **(F)**
- Leak Test Reports **(F)**
- Factory Acceptance Test Results **(F)**

8.5 FINAL DATA PACKAGE

- Final Data Package **(C)**
 - Redlined fabrication drawings.
 - Component Calibration certification for pressure gauge, relief valves, and filters.
 - Material certifications

- KNPR 8715.3 Component Documentation (component vendor data sheets identified by unique component find number)
- Weld Inspection Reports
- Hydrostatic Test Reports
- Cleanliness Certifications
- Include copies of all pre-work and fabrication phase submittals

APPENDIX A – QUALITY INSPECTION POINTS

TITLE: GN2 Hazardous and Camera Purge Panel		Tracking No. 10C00002	Page 1 of 1
ITEM NUMBER	INSPECTION CHARACTERISTIC	INSPECTED BY	DATE INSPECTED
1.	Quality shall be notified of the Hydrostatic Test.		
2.	Quality shall be notified when all welding is complete prior to coating.		
3.	Quality shall be notified prior to all blasting and coating operations.		
4.	Quality shall be notified and witness the final panel assembly BEFORE precision cleaning and leak testing.		
5.	Quality shall be notified and witness the final panel assembly AFTER precision cleaning.		
6.	Quality shall be notified and witness the Leak Testing		
7.	Quality shall be notified and witness the Functional Testing		

APPENDIX B – APPROVED CLEANING FACILITIES

Wiltech of Florida Corporation
P.O. Box 21052
Kennedy Space Center, FL 32815-0052

Precision Fabricating & Cleaning Co. Inc.
3975 Railroad Ave.
Cocoa, FL 32926-5975

United Contamination Control
241 Zimmerman Lane
Langhorne, PA 19047

Astro Pak
12201 Pangborn Ave.
Downey, CA 90241

Chemko Technical Services
5325 North US 1
Mims, FL 32754